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# Benefits and Harms of Lung Cancer Screening by Chest Computed Tomography: A Systematic Review and Meta-Analysis



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## ABSTRACT

### PURPOSE

This meta-analysis aims to combine and analyze randomized clinical trials comparing computed tomography lung screening (CTLS) versus either no screening (NS) or chest x-ray (CXR) in subjects with







COMPANION ARTICLES

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Meta-Analyses guidelines. Subgroup analyses by comparator (NS or CXR) were performed. Pooled risk ratio (RR) and relative 95% CIs were calculated for dichotomous outcomes. The certainty of the evidence was assessed using the GRADE approach.

## RESULTS

Nine eligible trials (88,497 patients) were included. Pooled analysis showed that CTLS is associated with: a significant reduction of lung cancer–related mortality (overall RR, 0.87; 95% CI, 0.78 to 0.98; NS RR, 0.80; 95% CI, 0.69 to 0.92); a significant increase of early-stage tumors diagnosis (overall RR, 2.84; 95% CI 1.76 to 4.58; NS RR, 3.33; 95% CI, 2.27 to 4.89; CXR RR, 1.52; 95% CI, 1.04 to 2.23); a significant decrease of late-stage tumors diagnosis (overall RR, 0.75; 95% CI, 0.68 to 0.83; NS RR, 0.67; 95% CI, 0.56 to 0.80); a significant increase of resectability rate (NS RR, 2.57; 95% CI, 1.76 to 3.74); a nonsignificant reduction of all-cause mortality (overall RR, 0.99; 95% CI, 0.94 to 1.05); and a significant increase of overdiagnosis rate (NS, 38%; 95% CI, 14 to 63). The analysis of lung cancer–related mortality by sex revealed nonsignificant differences between men and women ($P$ = .21; I-squared = 33.6%).

## CONCLUSION

Despite there still being uncertainty about overdiagnosis estimate, this meta-analysis suggested that the CTLS benefits outweigh harms, in subjects with cigarette smoking history, ultimately supporting the systematic implementation of lung cancer screening worldwide.



## CONTEXT

### Key Objective

This meta-analysis provides an updated estimation of the benefits and harms associated with computed tomography lung screening (CTLS) in subjects with cigarette smoking history, which may serve as scientific support for evidence-based guidelines.

### Knowledge Generated

CTLS was associated with a significant 20% reduction of

supporting the systematic implementation of lung cancer screening worldwide.



## AUTHOR CONTRIBUTIONS

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compensated unless otherwise noted. Relationships are self-held unless noted. I = Immediate Family Member, Inst = My Institution. Relationships may not relate to the subject matter of this manuscript. For more information about ASCO's conflict of interest policy, please refer to www.asco.org/rwc or ascopubs.org/jco/authors/author-center.

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